

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/7/2008 has been entered.

### ***Allowable Subject Matter***

The indication of allowable subject matter in Claims 1, 3, 5-7, 24-29, 34, 36-41 and 67 is withdrawn in view of a modified interpretation of the claims and of the cited prior art.

### ***Response to Arguments***

Applicant's amendments and arguments have overcome the outstanding rejections under 35 U.S.C. 112 and the outstanding rejections over the cited prior art. Therefore, the rejections have been withdrawn. However, upon further consideration, new grounds of rejection are made as detailed below

### ***Claim Objections***

Claim 11 is objected to because of the following informalities: In line 10, the word “the” preceding “a” should be omitted. Appropriate correction is required.

***Claim Rejections - 35 USC § 112***

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1, 3, 5-7, 9-13, 16-21, 24-29, 34, 36-47, 49, 61 and 65-70 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites “the reaction product or products of said carbonate with gaseous CO<sub>2</sub> and one or more medium-strong to strong H<sub>3</sub>O<sup>+</sup> ion-providers.” It is not clear if the products are between the carbonate and CO<sub>2</sub>, the carbonate and H<sub>3</sub>O<sup>+</sup> ion-providers, the carbonate and CO<sub>2</sub> and H<sub>3</sub>O<sup>+</sup> ion-providers, or a combination of the foregoing. Insertion of the word “with” before one or more medium-strong to strong H<sub>3</sub>O<sup>+</sup> ion-providers would overcome this rejection.

Claim 1 also recites that the quantity in moles of the H<sub>3</sub>O<sup>+</sup> ion-providers relative to the moles of CaCO<sub>3</sub> is in total between 0.1 and 2. The presence of H<sub>3</sub>O<sup>+</sup> ion-providers is not recited in the composition, thus it is not clear how there can be a ratio of H<sub>3</sub>O<sup>+</sup> ion-providers to CaCO<sub>3</sub> or how such ratio relates to the composition. Does the composition comprise H<sub>3</sub>O<sup>+</sup> ion-providers, CaCO<sub>3</sub> and the above products wherein the a ratio of H<sub>3</sub>O<sup>+</sup> ion-providers to CaCO<sub>3</sub> is the claimed range? Is the ratio intended to

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relate to the initial quantities of  $\text{H}_3\text{O}^+$  ion-providers and  $\text{CaCO}_3$  prior to forming the products thereof? In the last case, a process step of reacting the  $\text{H}_3\text{O}^+$  ion-providers and  $\text{CO}_2$  with  $\text{CaCO}_3$  is implied.

Claims 9, 11, 17 and 21 recite in multiple locations treating pigments, fillers or minerals with “a combination of one or more medium-strong to strong  $\text{H}_3\text{O}^+$  ion-providers and gaseous  $\text{CO}_2$ ”. It is not clear if the pigments, fillers or minerals can be treated with one or more medium-strong to strong  $\text{H}_3\text{O}^+$  ion-providers and not with  $\text{CO}_2$ , or with one or more medium-strong to strong  $\text{H}_3\text{O}^+$  ion-providers and with gaseous  $\text{CO}_2$ . Insertion of the word “with” before gaseous  $\text{CO}_2$  would overcome this rejection.

Claim 11 recites in line 17 that the papers filled with untreated and with treated pigments, fillers or minerals “have equal areas.” Papers can have a broad range of thicknesses in the art, making any comparisons between papers filled with untreated vs. treated pigments irrelevant. The claim is thus indefinite as it does not specify the metes and bounds of the desired protection. Since every other claim with a similar construction recites “equal areas and thicknesses”, the Examiner believes the omission of “and thicknesses” to have been inadvertent, and the claim will be examined as if it read “equal areas and thicknesses.” Insertion of “and thicknesses” as in other claims will overcome this rejection.

Claims 9 and 17 recite the limitation “the treated pigments” (line 6) in reference to an earlier portion of the claim. There is insufficient antecedent basis for this limitation in the claim as treated pigments are not previously recited. Removal of the word “the” would overcome this rejection.

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Claim 17 recites (lines 2 and 3) "a natural carbonate ( $\text{CaCO}_3$ ).” It is not clear if the natural carbonate is intended to be natural calcium carbonate, as recited in every other independent claim, or if ( $\text{CaCO}_3$ ) is merely indicative of a representative species.

Claim 21, line 15 recites "the final pH of the suspension" but fails to recite whether the suspension is the treated aqueous suspension or the aqueous suspension of pigments, fillers or minerals prior to treatment. Insertion of the word "treated" before suspension would overcome this rejection.

Claims 47 and 49 recite "the suspension" claimed in Claim 21, but fail to recite whether the suspension is the treated aqueous suspension or the aqueous suspension of pigments, fillers or minerals prior to treatment. Insertion of the word "treated" before suspension would overcome this rejection.

Claim 61 recites the limitation "the treated aqueous solution" in reference Claim 21. There is insufficient antecedent basis for this limitation in the claim as Claim 21 recites a treated suspension. Changing the word "solution" to "suspension" would overcome this rejection.

The remaining claims depend from and thus inherit the indefiniteness of one of the above rejected claims.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 3, 5-7, 9, 10-13, 16-21, 37-45, 67 and 68 are rejected under 35 U.S.C. 103(a) as unpatentable over Passaretti (5043017) as evidenced by Laurila-Lumme (6623599) and the Encarta Encyclopedia "Limestone (mineral)".

Claims 1, 3, 9, 10, 17, 19, 21, 38, 44, 67 and 68: Passaretti discloses a process for treating a slurry of either precipitated  $\text{CaCO}_3$  or fine ground limestone (natural  $\text{CaCO}_3$ ) and the slurries produced thereby. The process comprises:

adjusting the pH of a slurry of  $\text{CaCO}_3$  to 8.0 using  $\text{CO}_2$  (although not explicitly disclosed, a gaseous  $\text{CO}_2$  supply would have been obvious as a typical source of  $\text{CO}_2$ ), and  
mixing and reacting the slurry with at least about 0.1 wt-% of a calcium chelating agent (e.g.-hexametaphosphate) and at least about 0.1 wt-% of phosphoric or sulfurous acid (medium strong  $\text{H}_3\text{O}^+$  ion provider) (Abs; col 4, lines 9-22; col 6, lines 45-47).

Passaretti discloses that the pH of the slurry is lowered to approximately 5.0 when treated with acid (corresponds to step a), but rises in a few minutes (without the addition of a base) to 8.0 or above when the phosphoric acid is used up and  $\text{CaCO}_3$  dissociates (col 5, lines 54-68). Formation of gaseous  $\text{CO}_2$  when  $\text{CaCO}_3$  dissociates in water is basic chemistry (see Laurila-Lumme, col 2, lines 20-32 if evidence is needed), thus the acid-treated  $\text{CaCO}_3$  is further subject to treatment with gaseous  $\text{CO}_2$  (corresponds to step b), accompanied by or followed by the rise in pH to the claimed range.

Specific reaction products of the phosphoric acid with  $\text{CaCO}_3$  are disclosed in the treated slurry (col 5, lines 59-68). Although specific products of  $\text{CO}_2$  and  $\text{CaCO}_3$  are not disclosed, the ingredients are agitated together and the claimed products would be present in the slurry or, at least, such products would have been obvious to one of ordinary skill in the art.

Passaretti discloses several examples wherein varying amounts of hexametaphosphate from 0 to 6% and up to 6% phosphoric acid, based on the weight of  $\text{CaCO}_3$ , are reacted with the carbonate (col 6, line 50 to col 7, line 63, Examples 1-4, Figures 1-4). The results are similar for precipitated and ground natural  $\text{CaCO}_3$ . From Fig. 3, treating  $\text{CaCO}_3$  using hexametaphosphate at the lower limit of 0.1 wt-% also results in a pH in the claimed range for amounts of acid at least up to 6 wt-% based on the weight of  $\text{CaCO}_3$ .

The range of phosphoric acid to  $\text{CaCO}_3$  disclosed by Passaretti overlays the claimed range. From the disclosure and examples of Passaretti, obtaining the claimed aqueous emulsion and final pH would have been expected or obvious to one of ordinary skill in the art from treating  $\text{CaCO}_3$  with the claimed amount of phosphoric acid and either 0 or 0.1% hexametaphosphate, which is in the disclosed range.

No particular temperature requirements are specified by Passaretti for the treatment. Absent convincing evidence of unobvious results, it would have been obvious to one of ordinary skill in the art to perform the treatment and/or pH measurement at ambient temperature (e.g. 20 °C) or at the claimed elevated temperature and to have a reasonable expectation of success..

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Passaretti does not disclose the comparative weights of paper filled with treated and untreated  $\text{CaCO}_3$ . However, the disclosed composition overlays the claimed composition, thus obtaining the claimed properties in filled papers would have been obvious because, where the claimed and prior art apparatus or product are identical or substantially identical in structure or composition, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977).

Claims 5-7 and 39-41: Passaretti discloses surface areas of the precipitated  $\text{CaCO}_3$  from 7-11  $\text{m}^2/\text{gm}$  and particle sizes from 0.7 to 1.4 microns (col 6, lines 37-45). Similar particle sizes and surface areas would have been obvious to one of ordinary skill in the art for the ground natural  $\text{CaCO}_3$ . While the particular instruments and methods used for the measurements are not specified, the Sedigraph instrument is commercially available and would have been obvious to use. BET surface area is also widely practiced and would have been obvious.

Regarding the higher claimed surface areas, absent convincing evidence of unobvious results, it would have been obvious to one of ordinary skill in the art to use larger particle sizes and/or higher surface areas in the process and to have a reasonable expectation of success.

Claims 11, 16, 42, 43 and 45: Passaretti discloses in Examples 1 and 4 (col 6, line 50 to col 7, line 63, Figs. 1 and 4) treating  $\text{CaCO}_3$  with 2% and 6% phosphoric acid. In both cases, the pH obtains the claimed value between 1 and 10 hours, with little

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change occurring after 2 hours. It would thus have been obvious to one of ordinary skill in the art to obtain the claimed duration of step b) of 2 to 6 hours.

Regarding Claim 42, no pressure requirements are disclosed by Passaretti, thus performing the treatment at ambient pressure would have been obvious to one of ordinary skill in the art. The  $\text{CO}_2$  produced by dissociation of  $\text{CaCO}_3$  is thus at atmospheric pressure.

Regarding Claim 43, no further required treatment is disclosed after the rise in pH.

Claim 12: multiple treatments are not disclosed by Passaretti. Absent convincing evidence of unobvious results, adding the acid incrementally would have been obvious to one of ordinary skill in the art as a functionally equivalent method of adding the acid, thus repeating the process several times with smaller increments of added acid.

Claim 13: Figures 1-4 show that the return to higher pH is over a time period of several hours. It would have found it obvious to one of ordinary skill in the art that steps a and b are occurring simultaneously in the process of Passaretti, thus the pH remains below 7.5 for at least part of both steps.

No particular temperature requirements are specified by Passaretti, thus it would have been obvious to perform the treatment and pH measurement at ambient temperature (e.g..20 °C).

Claims 18 and 37: Natural limestone comprises primarily  $\text{CaCO}_3$  in calcite form (see "Limestone(mineral)", Introduction) if evidence is needed).



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Claim 20: Passaretti teaches that polyphosphates such as hexametaphosphate are known in the art as dispersants for  $\text{CaCO}_3$  slurries (col 2, lines 37-54).

Claim 21 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Passaretti.

The disclosure of Passaretti is used as above. Claim 21 is a product-by-process claim. The product of Passaretti appears to be the same as or similar to the claimed product, a slurry comprising the claimed reaction products and pH, although produced by a different process. The burden therefore shifts to applicant to come forward with evidence establishing an unobvious difference between the claimed product and the prior art product. In re Marosi, 710 F.2d 798, 802, 218 USPQ 289, 292 (Fed. Cir.1983). “In the event any differences can be shown for the product of the product-by-process claim 21 as opposed to the product taught by the reference Passaretti, such differences would have been obvious to one of ordinary skill in the art as a routine modification of the product in the absence of a showing of unexpected results: see also In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985)”

Claims 24-28, 34, 36, 47, 49, 61, 65 and 66 are rejected under 35 U.S.C. 103(a) as unpatentable over Passaretti in view of Brown (5676746) and the papermaking process described in the instant specification as known in the art.

The disclosure of Passaretti is used as above. Passaretti discloses using the  $\text{CaCO}_3$  slurries as fillers in papermaking processes.

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Passaretti does not disclose adding the treated slurry to papermaking stock or coating a paper with the slurry. A polymeric dispersant is not disclosed. Passaretti also does not disclose the fiber sources for paper or the papermaking process steps. Passaretti further does not disclose that paper made using the pigment or filler can be used for printing.

Brown discloses adding a slurry of  $\text{CaCO}_3$  particles as a filler to a papermaking slurry or coating a paper or paperboard with the slurry (applying to a sheet of paper). The  $\text{CaCO}_3$  can be from natural or synthetic sources. The treated paper has increased bulk and enhanced printing properties (Abs; col 7, lines 2-19; col 8, lines 32-64; col 14, lines 21-32). A polymeric dispersant is added (col 10, lines 57-60). Brown discloses that it is known to use dolomite, calcium carbonate, kaolin, talc and titanium oxide as fillers and pigments in papermaking (col 1, lines 11-15).

The instant disclosure teaches that a specialist in the field would know that a process of making paper comprises making a paste essentially comprising fibers, such as resinous or deciduous wood or synthetic fibers (non-wood), fillers and water. The paste is diluted to produce a thin stock, to which is added flocculants and/or retention aids. The stock is drained to form a paper. The formed sheet can be coated (pp 1-2).

The art of Passaretti, Brown and the instant invention is analogous in that they pertain to filled and/or coated paper. It would have been obvious to one skilled in the art at the time of the invention to use the  $\text{CaCO}_3$  slurries of Passaretti as fillers added to papermaking stock or as coatings in view of Brown as well known uses for  $\text{CaCO}_3$  and to obtain the disclosed bulking and printing properties. Adding a polymeric dispersant

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would have been obvious to maintain the carbonate in dispersed state. It would further have been obvious to use wood or non-wood fibers as typical raw materials well known in papermaking. The claimed papermaking steps would have been obvious as a typical process in the art. Drying the formed paper is also a typical papermaking step.

Agitation of the papermaking stock would have been obvious in many of the normal papermaking process steps that provide shear, such as the dilution step, pumping steps, screening steps, etc. It also would have been obvious to print on the coated and filled paper having enhanced printing properties using conventional digital printing machines. Sheet or board materials produced by the process would have been obvious.

Claims 29 and 46 are rejected under 35 U.S.C. 103(a) as unpatentable over Passaretti in view of Holloway (3002940).

The disclosure of Passaretti is used as above. Passaretti does not disclose a paint comprising the  $\text{CaCO}_3$  slurry.

Holloway teaches that typical water-base latex paints comprise a latex resin, suspended or dispersed pigments and a thickener (col 1, lines 14-25). Holloway discloses a particular thickening/suspending/emulsifying agent for such paints that provides improvement over prior art thickeners (col 1, lines 36-64). Examples of standard paint formulations comprise pigment slurries or dispersions containing  $\text{CaCO}_3$  and latex (col 8, lines 32-52).

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The art of Passaretti, Holloway and the instant invention is analogous as pertaining to the use of  $\text{CaCO}_3$  slurries. It would have been obvious to one of ordinary skill in the art to use the  $\text{CaCO}_3$  slurry of Passaretti as the pigment in a paint formulation in view of Holloway as a typical ingredient in such formulations and to have a reasonable expectation of success.

### ***Allowable Subject Matter***

9. Claims 69 and 70 are allowable.

The following is an examiner's statement of reasons for indication of allowable subject matter: The nearest prior art, Passaretti, discloses acid and  $\text{CO}_2$  treatment of carbonates using organic acid or the claimed medium-strong acids in the process. The claimed strong acids are not disclosed. Since the objective of Passaretti is to form a calcium carbonate that is stable in a mildly acidic environment due to the buffering action of an adsorbed or reacted calcium-chelating agent on the surface of the carbonate and a weak acid in solution (col 3, line 61 to col 4, line 5), the use of strong acids would not have been an obvious option to form such a buffered environment.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DENNIS CORDRAY whose telephone number is (571)272-8244. The examiner can normally be reached on M - F, 7:30 -4:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Griffin can be reached on 571-272-1189. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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